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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/804,534	03/12/2001	John Joseph Garrity	UK998125US2	9748

7590 03/03/2004

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EXAMINER

WILLIAMS, ALEXANDER O

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 03/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/804,534

Applicant(s)

GARRITY ET AL.

Examiner

Alexander O Williams

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 13-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

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Serial Number: 091804534 Attorney's Docket #: UK998125US2

Filing Date: 3/12/2001: claimed foreign priority to 12/9/98

Applicant: Garrity et al.

Examiner: Alexander Williams

Applicant's Amendment, filed 1/26/2004 has been acknowledged.

Claims 1 to 12 have been canceled.

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Claims 13 to 19 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 13, 17 and 18, it is unclear and confusing to what is meant by "adapted for".

Any of claims 13 to 19 not specifically addressed above are rejected as being dependent on one or more of the claims which have been specifically objected to above.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Patentability shall not be negated by the manner in which the invention was made.

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This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 13 to 19, insofar as they can be understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Hall et al. (U.S. Patent # 5,184,768) in view of Sakemi et al. (U.S. Patent # 5,489,750).

In claim 13, Hall et al. (figures 1A to 4B) specifically figures 2A and 2B show an electrical structure, comprising: a substrate **20** for the attachment of a ball grid electronic package **25** thereto by means of solder balls **28** and solder paste **28** wherein connection is made between a contact **26** on the ball grid array electronic package and a solder ball by means of a first joining medium land between said solder ball and a substrate contact **22,24** arranged on the substrate by means of a second joining medium and wherein the contact arranged on the substrate and has at least one transverse dimension greater than a diameter of said solder ball; in which said substrate contact is adapted for X-ray inspection by directing X-Rays through said electronic package to illuminate said solder ball and said contact, so that a bad joint shows in said x-rays as a round image of said solder ball and a good joint, in which said solder ball flows into said shape, shows in said X-rays as an image. Hall et al. fail to explicitly show a substrate contact arranged on the substrate by means of a second joining medium and wherein the contact arranged on the substrate is substantially quadrilateral in shape and has at least one transverse dimension greater than a diameter of said solder ball; in which said substrate contact is adapted for X-ray inspection by directing X-Rays through said electronic package to illuminate said solder ball and said contact, so that a bad joint shows in said x-rays as a round image of said solder ball and a good joint, in which said solder ball flows into said substantially quadrilateral shape, shows in said X-rays as a quadrilateral image.

Sakemi et al. is cited for showing an electronic part with bumps on a circuit board. Specifically, Sakemi et al. (figures 7a to 16) specifically figures 7a and 7c discloses and a substrate contact **6** arranged on the substrate **20** by means of a second joining medium **4** and wherein the contact arranged on the substrate is substantially quadrilateral in shape and has at least one transverse dimension greater than a diameter of said solder ball; in which said substrate contact is adapted for X-ray

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inspection by directing X-Rays through said electronic package to illuminate said solder ball and said contact, so that a bad joint shows in said x-rays as a round image of said solder ball and a good joint, in which said solder ball flows into said substantially quadrilateral shape, shows in said X-rays as a quadrilateral image for the purpose of accurately determining the bonding quality in the appearance inspection between a substrate and device.

In claim 14, Sakemi et al.'s contact 6 arranged on the substrate is substantially square in shape.

In claim 15, either reference joining medium is solder paste.

In claim 16, either reference show the solder ball has an initial, substantially round shape prior to making said connections.

17. A selectrical structure as claimed in claim 13, either reference show wherein said contact has a thickness less than a thickness of said solder ball and a surface adapted for flowing said solder throughout said transverse dimension, so that in a good joint material from said solder ball flows to cover the transverse extent of said contact and produces an image different from a corresponding image of a bad joint.

18. A substrate as claimed in claim 17, Abbott et al.'s wherein said surface adapted for flowing said solder throughout said transverse dimension is substantially planar, so that solder flow is unimpeded.

19. A electrical structure as claimed in claim 13, Sakemi et al. show wherein said at least one transverse dimension is a diagonal of said quadrilateral that is greater in length than a corresponding diameter of said solder ball.

Therefore, it would be obvious to one of ordinary skill at the time of the invention to use Sakemi et al.'s quadrilateral pad to modify Hall et al.'s pad for the purpose of accurately determining the bonding quality in the appearance inspection between a substrate and device.

The listed references are cited as of interest to this application, but not applied at this time.

Response

Applicant's arguments filed 1/26/04 have been fully considered, but are moot in view of the new grounds of rejections detailed above.

The insertion of Applicant's additional claimed language, for example, "in claim 13 and new claims 17-19 in the previous amendment" cause for further search and consideration to make this action final.

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Applicant's amendment necessitated the new grounds of rejection. Accordingly, **THIS ACTION IS MADE FINAL**. See M.P.E.P. § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.

Field of Search	Date
257/738,737,734,777-781,786,690,692,693,668,772,703 228/180.22,103,104,105,254	12/11/03 2/19/04
Electronic data base(s): U.S. Patents EAST	12/11/03 2/19/04

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander O Williams whose telephone number is (571) 272 1924. The examiner can normally be reached on M-F 6:30-7:00PM.


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272 1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center 2800 receptionist** whose telephone number is **(571) 272-2800**.

2/21/04

A handwritten signature in black ink, appearing to read 'A. Williams', with a stylized flourish at the end.

Primary Patent Examiner
Alexander O. Williams